

## THESAURUS USING ELECTRONIC RESEARCH HEALTH SCIENCES

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### ABSTRACT

**Objectives:** To orient scientific inquiry through the employ of controlled languages using specialized thesauri in the literature searches and construction of taxonomies, which give the basic tools for constructing knowledge of a phenomenon of interest in Health Sciences.

**Method:** A descriptive study that was conducted in five phases that guided the entire process and semantic of the literature search.

**Results:** We designed a hierarchical structure and sequential logic (taxa tree research), using specialized thesauri and controlled, making proper use of information and electronic systems to obtain a clear understanding of the phenomenon under study and the operation mechanisms in order to be properly used in the investigation

**Conclusions:** The Semantic Field of Search allows understanding the structure of some area of knowledge and relationships that exist within this structure consists of a network initially covering different topics. It allowed an orderly and systematic review of existing knowledge and the proper use of the databases and sources of information through controlled languages.

**KEYWORDS:** Thesauri, MeSH, Databases

### INTRODUCTION

This article is the result of the literature review and search of information with scientific and methodological rigor of doctoral thesis "Uncertainty, Quality of Life and Body image in women undergoing mastectomy"; It also included the proper use of specialized thesauri, and construction of taxonomies to their tree taxa and existing knowledge in the subject area selected for the work done in the Research Seminar course, the PhD in Nursing from the National University of Colombia.

Searching for information (1) is key in the development of rigorous research, although often the dilemma of not knowing where to start arises; Researchers in this field have been treated in depth by setting specific differences in methodologies, objectives, implementation techniques, applications, content and applications. Once the sources of information are identified to be: access, search, retrieve, analyze, and report writing. In fact, this is part of learning and how they are acquired. When you think about a research problem many questions arise. First, it is part of a thematic area that is selected from the observation of reality; then relevant, interesting and logical questions arise such as: What is known and not known about the phenomenon being studied, and thus the gaps in knowledge identified?.

With this information we begin to build a network that covers the research problem. This network must have a logical and sequential structure, we built our temática. De search area this area of information emerge, literature reviews and the construction of taxonomies to their tree taxa (sortable). Searches should be strict in terms of query databases and other sources of information through electronic systems (2). To make proper use of these systems must learn to use them. You need to understand how well the subject and this is reflected through controlled languages through specialized thesauri. We must have a clear understanding of the mechanisms of operation for use in research properly. The aim of this article is to guide scientific inquiry through the use of controlled languages using thesauri in specialized literature searches and taxonomy construction, offering the basic tools for constructing knowledge of a phenomenon of interest in Health Sciences.

During the last decades have been fundamental thesauri parts intended to control the representation and retrieval of information on any subject vocabulary. Today, these tools remain useful controlled vocabulary, especially in the electronic version for the retrieval of information in online databases. The structure of the Internet is a great help in the presentation of thesauri that can quickly link terms between which there is some kind of semantic relationship. Numerous Internet thesauri present in both the multidisciplinary type as those dealing with a specific subject. (3).

A thesaurus is a documentary language of combinatorial structure used to represent the content of the documents, in order to further recovery, through a preferred indexing terms \*, also called descriptors, systematically used to uniquely represent certain concepts . Such preferential terms or descriptors may consist of one or more words. The thesaurus also entered the non-preferred indexing terms (also called "non-descriptors") that are synonyms or near-synonyms of preferred terms that marginalizes the thesaurus in describing the content of documents, obeying certain explicit instructions, accessing the descriptors preferred terms or (3).

In this sense, the tools of controlled vocabulary called thesauri by their authors and that, without that name, are similar to the thesaurus, ie, to collect semantic relationships (hierarchical, associative and equivalence) between words are collected (3).

The literature search can be done in real or virtual libraries, archives or records. The most important sources of the present, information is the "Databases". A database consists of a set of data organized and interrelated, which are collected and exploited by information systems. The search is performed using a logical procedure that allows to obtain the desired results, which is due to: define, in one or more short sentences, the subject on which you want information (4).

The published scientific literature on an issue, it is essential to initiate the research base. At present, given the large amount of information available, it is important that they have the basic tools to discriminate what information has scientific relevance and should be taken into account and what not and answering the research question. An orderly and systematic review of the literature is a way of evaluating and interpreting all available research that is relevant with respect to a particular research question and a subject area or phenomenon of interest (5).

## METHODOLOGY

A descriptive study was conducted and organized a thorough literature review and information search in 5 phases as follows: in the first phase described the main thesaurus in Health Sciences with its main descriptors and examples; in the second phase the MeSH (Medical Subject Headings, guide to nomenclature and classification of the NLM National

Library of Medicine U.S.) (3) and their respective application were used; in the third phase construction of taxonomies is presented using simple, advanced and visual examples with their searches; in the fourth phase using the MeSH thesaurus and the construction of the taxonomic tree is explained; in the fifth phase different search combinations were described using Boolean terms and the final synthesis of searches, allowing the organization and classification of knowledge constructed and most relevant detection of gaps in the subject area to study (6).

The ethical considerations of the study followed the guidelines established by the Research Office Bogotá (DIB) of the Universidad Nacional de Colombia (7), and the principles that have responsibility for the ethical practice of the profession of nursing in Law 911 of 2004 (8).

Recommended by the Ethics Committee of the Faculty of Nursing at the National University of Colombia and ethical principles were considered are: respect for autonomy, non-maleficence, beneficence, justice, privacy, confidentiality and reciprocity principle (9).

### **Thesauri in Health Sciences**

The thesaurus Medical Subject Headings (MeSH) is a tool used at the base of MEDLINE / PUBMED database created by the National Library of Medicine (NLM) in the United States. The MeSH are a guide to nomenclature and classification of NLM consisting of a set of descriptors or headers sorted alphabetically and hierarchically, used in library cataloging and whose knowledge facilitates searches.

Within the website of the National Library of Medicine, in which numerous databases of bio-medicine are housed, the thesaurus Sciences Health more known and used is: the Medical Subject Headings (MeSH). Its main function is to assist in the work of indexing, cataloging and searching the database MEDLINE / PUBMED data base NLM cataloging data,. This is an English-language thesaurus of enormous dimensions, 22,997 descriptors, which contains the following types of terms: descriptors, not descriptors, qualifiers, names and types of publications. Content is available thesaurus terms sailing from header (tree top) of the 16 thematic areas of hierarchical or using the search index.

The presentation of the hierarchical index focuses more on display only terms directly related to the term consulted all their superiors and their specific immediate, which collect the hierarchical structure of each area, perhaps because of the large size of the thesaurus. The search engine allows for an exact search, use the Boolean operators AND and NOT, and limiting Browse a wide range of parameters. The presentation of information about each descriptor includes its permitted qualifiers, their equivalents and associated terms, various notes, definitions and use systematic index fragments in which the descriptor is located. The content is updated constantly. The MeSH thesaurus has been the basis for the development of various thesauri Health Sciences (3).

DeCS terms were created by library in Brazil, which runs on the central campus of the Federal University of São Paulo (UNIFESP), since its establishment in 1967 under agreement between PAHO and the Brazilian government. The Latin American and Caribbean Center on Health Sciences Centre (NLM) created the Portuguese, Spanish and English trilingual structured vocabulary, MeSH-Descriptors in Health Sciences. Its main purpose is indexing, search and retrieval of scientific literature in various databases as health sciences LILACS (scientific and technical literature in Health in Latin America and Caribbean). IBECS (Spanish bibliographic index of Health Sciences) in MEDLINE and the version maintained by the Virtual Health Library of Brazil.

The Macrothesaurus (DeCS) contains 28,691 descriptors grouped into 20 thematic areas, including sixteen more MeSH thesaurus and other health science, public health, homeopathy and health surveillance. The content query can be performed in any of the three languages of the thesaurus, either through a browser or through the alphabetical indices permuted systematic posing. The search engine allows the use of descriptors accurate or complete terms, but not root words. The view through the indexes are sailing from the terms header in the case of systematic index; selecting a letter in the case of alphabetical index, or by entering a word or root in the form that is presented to check the permuted index KWOC. This is a type of permuted index that varies in its presentation regarding the KWIC index, which keywords appear as a heading on a separate line. Under each heading all the titles, complete or truncated, containing the key word in question appears. The KWIC index is a type of permuted index in which the thematic content of a work is represented using keywords in your title or other source document information. The content of the thesaurus is subjected to a constantly updated (10).

It is important to select the taxonomic tree, because it allows us to guide the literature searches. The taxonomy is a hierarchical structure of taxa. Taxa synonymous names appear in red on the tree, with the taxon name (the name that is different from the internal code name code).

Can guide the search in several ways: simple or basic search, advanced search and visual search.

- **Single Search**

Involves introducing the term or terms that interest us directly in the search box. PubMed search start comparing our terms successively with four lists of terms. These lists are: "MeSH translation table" (a list of MeSH terms and synonyms), "Journals translation table" (a list with the names and abbreviations of journals), "Phrase list" (a list of phrases created from of MeSH terms, the terms "unified medical language" and the names of substances) and "Author index" (a list with the names of the authors) (11). As not find a match keep looking.

If you do not find agreement on any of the four lists, PubMed will search each word individually in all fields of the records of your database. If we introduce our phrase in quotes, then PubMed search for that phrase as it is introduced in the "Index", a list containing several million words and phrases taken from Medline records. In this case there will be sought in the first four lists. Having found the concordance searches PubMed database records containing it and we will display the results on the results page (11). Given these parameters and the initial search process in the following example tree taxa used to facilitate basic search of the subject area is shown below:

### Tree Taxa for Breast Disease

#### Simple Search

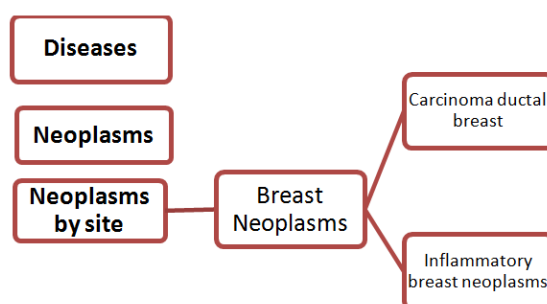


Figure 1

The graph shows the terms of entry to facilitate search MeSH descriptors.

The following were selected by the MeSHthesaurus which guided the search descriptors: Carcinoma, Infiltrating duct carcinoma Invasive Ductal Breast Carcinoma, mammary Ductal, Breast Invasive Ductal Carcinoma, Ductal Mammary Carcinoma.

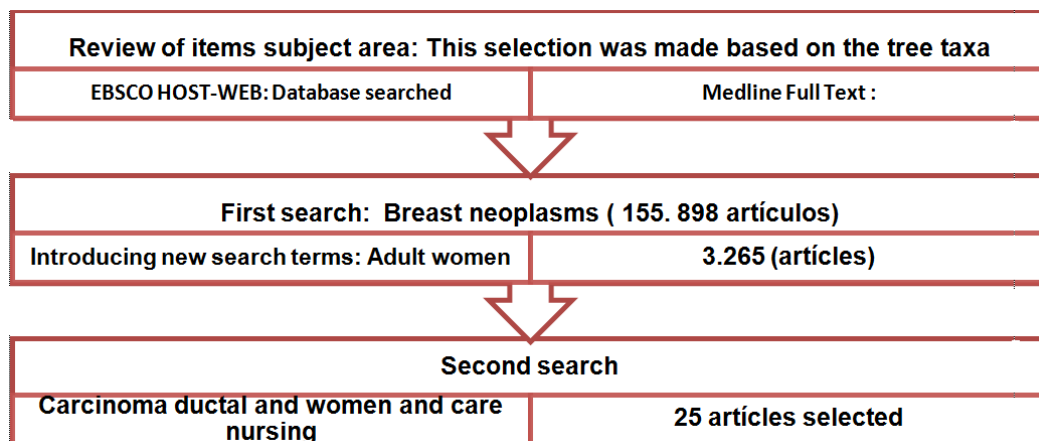
These terms thesaurus entry are those that allow us to guide search in databases. After the simple search begins to build the tree taxa taking into account the characteristics of the object of study as are the search criteria or the period of time to investigate. Generally searches are performed spanning the last 10 years. It is essential to specify what kind of literature will see: reviews, research articles, historical documents, among others.

When the researcher begins with search and review of the literature, especially in the early work, often doubt if you've read enough or otherwise is necessary to continue looking into the phenomenon and study and you experience interest. In this situation, talk, insist and persist in this startup phase, while being slower to build. It's the biggest and best needs to be done, orderly and widely, because if the problem is too studied, and checked as it progresses in reading and searching, there results sufficient to answer the questions raised, perhaps not worth following on that line since everything is studied and shown not need repetition. If, however, the subject was new, it is equally important to review the work researched and organized from what is already known and not known about the phenomenon of interest, focusing on the questions that remain unresolved, filling gaps in knowledge and Thus, advancing the discipline and science.

### Terms of Basic Research Finding

The following table shows the sequence of a basic search. To the extent that the terms of entry include seeps information, selecting only research articles that interest us and guide us in building this theoretical base.

### Summary Review of Articles



**Figure 2**

It is essential to know the vocabulary thesaurus handles eg a taxonomy is a content management system following the introduction of a more friendly in the standard language, updating its content to the current environment of digital information, and expanding its scope to the wide range of organizations and content producers (12).

According to Grove (12), the principles providing a strict guide for building taxonomies were the rationale, empirical observation, the hierarchical structure based on property inheritance, evolutionary history, and pragmatic utility.

Terminological sources of general language still include the meaning especially oriented environment for experimental science. A taxonomy is a type of controlled vocabulary terms that all are connected by a structural model (hierarchical, tree, faceted) and especially oriented navigation systems, organizing and finding contents of web sites (13).

The use of taxonomies in the categorization of information resources provides the general strengths of controlled languages, such as: the treatment of semantic and syntactic aspects of language; implicit representation of concepts; creating an overview of the domains that are the subject of representation; comprehensiveness in indexing; and solving problems involving multilingual contexts (13). From the point of view of the management of web sites, the use of taxonomies in the categorization of resources provides two important additional benefits:

One hand, pays building efforts and maintaining the taxonomy and categorization of resources; since the same tool can be reused in the development of different applications of search, navigation, personalization, etc.. On the other hand, keeps the conceptual and designing consistency in the representation of elements of the same domain, creating users in an image of consistency throughout the website, and the entity that creates and maintains it (13).

- **Advanced Search**

Advanced searching of research articles, let go with a stream and a rigorous methodological studies in the area of health, according to the construction of organized taxonomic trees.

If you need to refine your search further, you can use some other options. First we must know some aspects of the search that can give us great maneuverability when narrow our field of interest.

You can use boolean operators (George Boole algebra) to combine terms that we introduce in the search box. Operators supported PubMed are AND, OR and NOT, which we write as well, in case. The AND operator find quotes that contain the previous term and the post operator, the OR operator find quotes that contain the term prior or subsequent to the operator, and the NOT operator not find quotes that contain the term after the operator.

EBSCO, Isi Web of Science, Hinari, Ovid, Medline and Pubmed: To perform this research review ordered in the following databases were consulted.

One of the most complete data bases in health are: EBSCO, Medline and Pubmed. The search was performed as follows: EBSCO: Ebsco Host Web. The database consulted was that meets the latest: Academic Search Premier: This multidisciplinary database contains the full text of nearly 4,500 publications, of which over 3,600 are refereed. It offers PDF versions of hundreds of publications dating back to 1975, or even earlier dates, and allows you to find references to more than thousand titles. This database brings together all previous and related research in Health Sciences.

## **Sequence of a Structured Review of Literature for the Construction of Tree Taxa**

### **Advanced Search**

The following diagram shows the sequence of an advanced search using Boolean operators described above: 14 quantitative research and review

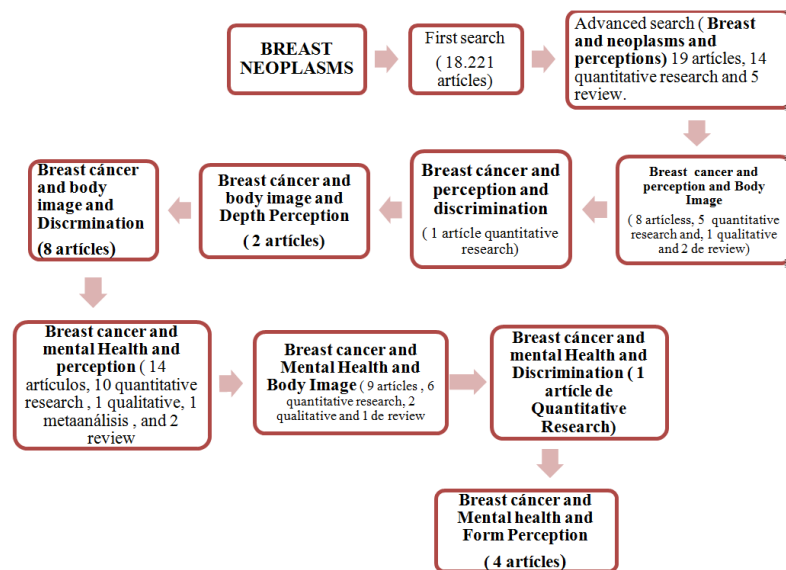


Figure 3

This orderly review of literature allows the construction of the taxonomic tree, showing the specificity of constructed knowledge, what is known and not known about the phenomenon under study. It also allows us to make a critical inventory of the articles reviewed, generating a theoretical ordering of parts and build our own criteria. The construction of our subject area leads to a sweep of all archived, organized and existing information in a systematic and orderly hierarchically.

- **Visual Search**

Organize, consult and guide built taxonomies, create a new tree and most important to locate items in the databases. In visual search results are presented on an interactive map. You can change the style of the results list at any time by selecting the block style or column style display menu styles. Style columns presents results list. The following order is the way to perform visual search.

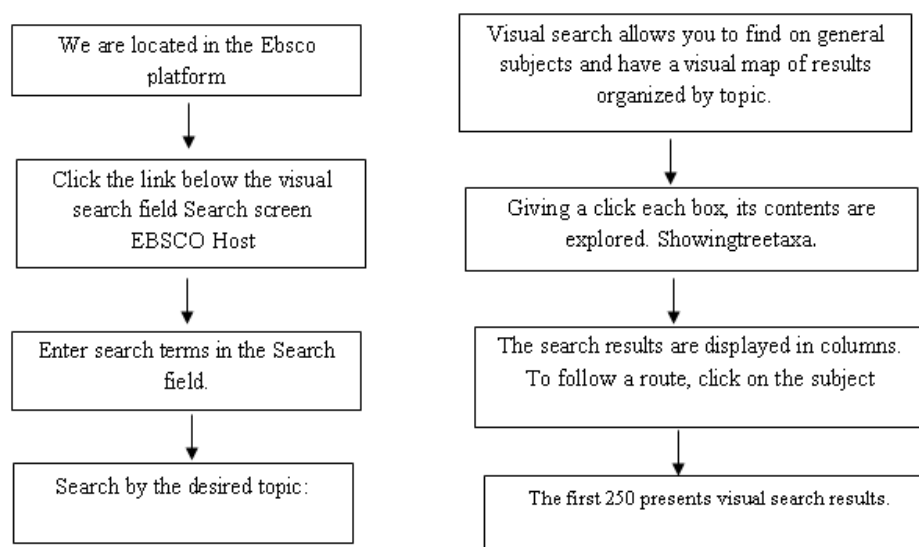


Figure 4



EBSCO Host is an online reference system accessible via the Internet. Offers a variety of multidisciplinary databases, mostly full-text collections that cover the general reference for public, academic, medical or corporate. Contains 12 databases completely updated. The visual search always rescues the 250 most recent results related to your search terms (14) as follows: Group Results - can be grouped by subject or name of the publication. Sort - You can sort the results by date (newest to oldest), or by relevance (most relevant items at the top of the list, which have less relevance in the bottom of the list). Filter results by date - Move the slider time interval displayed on the newest items to oldest. Show Style - Switch between blocks or columns of the view at any time.

To preview an article: click on the article title in the result. The Summary window displays information about the item, including title, author, journal name, and a brief summary (14).

Continuing to use the thesaurus MesH construction Taxonomy tree can be seen that: From the first search term "Breast neoplasms" and information obtained with 18,221 items found, begins with the first filter and mixes keywords, and Boolean terms using the Thesaurus principal Health MESH (Medical subject headings) which is a useful tool that facilitates the editing process of taxonomic models; this ordering (taxonomies) or science of classification consists of a hierarchy of nested taxa, allows us to target these searches. We know that a taxon is a taxonomic unit of any class or group of organisms within a hierarchical classification.

The MeSH (Medical Subject Headings) is a vocabulary of medical terms developed by the National Library of Medicine that describes the content of each document. This allows search Thesaurus Synonym accepted (the term must contain at least 3 characters). Then we display the MeSHtree, that shows the tree structure in which the term is applied, with a brief definition of the term appears; thus, the search for MeSH is only applicable to indexed database (15).

The "MeSH Subheadings" refer to thematic facets, and placed behind a particular heading allow you to select specific aspects. Employees often covers general topics and more accurately describes the main issues. To search for a qualifier or subheading click search ratings.

### **How to Make Combinations for Different Search Terms?**

The words or groups of words can be combined in different ways to change the direction of the search (You should always make uppercase): AND. Get only documents containing all of the specified terms.

"Breast AND neoplasms AND mastectomy" get only documents containing the word "mama", "neoplasia" and "mastectomy". OR. Get documents containing at least one of these terms. "Cancer OR neoplasm": locate documents containing either the word "tumor" or "cancer." NOT. If you use NOT between search terms, you will get items containing the first term but not the second. "Breast mastectomy NOT" Just get documents containing the word "mama" but not "mastectomy". You can also use these operators to combine previous search results from history. Use the search numbers (starting with the # character) and combine as above: # 2 AND # 4: any document which appeared in both searches, the # 2 and the # 4 was recovered.

There are two other ways to link search terms: NEXT.se obtain documents where these two words are next to each other in that order. "Breast neoplasms NEXT": all files that contain both words together will be collected. NEAR. Documents where these two words are separated by a maximum of six words in any order will be obtained. "Breast Cancer



NEAR" between the two words will be up to 6 words "Breast cancer is a problem of public health."

### Example of a First Search Using Boolean Operators

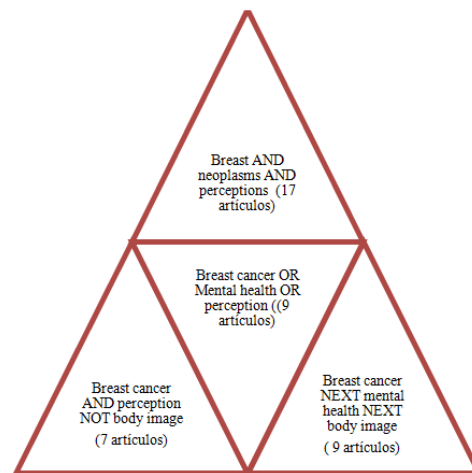


Figure 5

## RESULTS AND DISCUSSIONS

### Formal Procedure Search

The information available on the Internet is abundant reason, when performing the documentation for a research paper or even have a continuing vocational training should be performed information search process consists of an ordered series of stages, which helps make the search efficient and effective. An outline of the sequence would be as follows:

- Formulate the search query
- Select the information source
- Formulate the search profile (refers to the selection of concepts and use of Boolean operators).
- Perform Search
- Evaluate the search, whether or not successful (that meets the criteria for inclusion of articles).
- Save results and search profiles.

### Steps to Guide Mesh Searches

- The PubMed page that provides access to all databases opens.
- Select and open the MeSH database.
- This exercise will look for a MeSH term for cancer.
- Enter the query term in the blank box: cancer
- Among the results, you can see that the MeSH term for cancer is "Neoplasms".
- Click on the hyperlinked term to display more information.

- Check the definition provided for neoplasia.

Registering a MeSH term contains a definition of the term, associated qualifiers, a list of entry terms and MeSH tree view. If you review the definition of MeSH, is the description and qualifiers to the term (16).

The following is the sequence to follow to guide the creation of the trees on a literature search in PubMed:

- Searching Google Sign in
- PubMed Open page
- Provide click: PubMed Home, then More Resources, click on MeSH database, then Mesh Browser.
- Dar click in the box that appears: Navigate from tree top
- This action allows you to enter the MeSH terms targeting your search. In this case we click on "Diseases". These are the categories.
- Having defined the keywords or key concepts to guide your search, determine the category to consider according to the research topic within the relevant and proposed list of PubMed.
- In this case, the central search term is "Neoplasms", and will be directed as follows:
- Diseases, Neoplasms Neoplasms by site, Breast neoplasms breast ductal carcinoma ... and Inflammatory breast neoplasms.
- Was da click on the central term selected on the previous screen, so you can access the definition, synonyms, descriptors and data of interest to the database PubMed been attributed to the search term.
- This building can go all the trees in our research as the search criteria.

## TREE BRANCH OF BREAST CANCER

This tree taxa gives basic guidance on taxonomies constructed advanced searches and derive the possible combinations according to the descriptors MesH. This advanced search provides necessary guidelines and terms of entry to the Specialized Thesaurus. This will meet the methodological and scientific rigor for all inquiries.

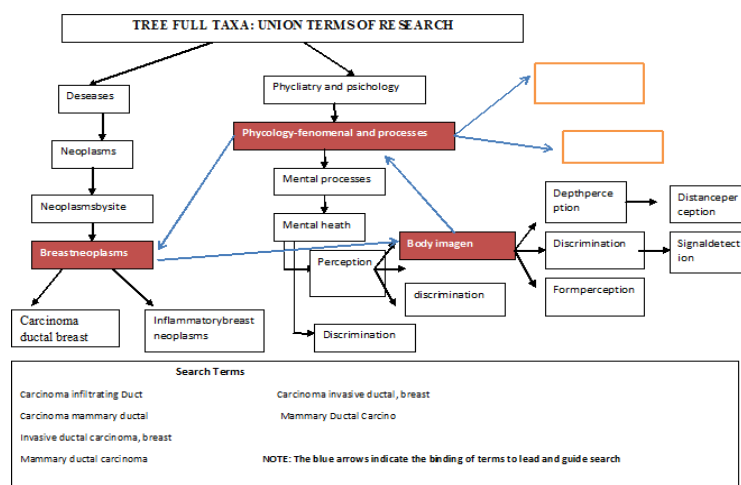


Figure 6

It is important to realize that saving the results should be organized by a chart summarizing all the information obtained in searches. This is an example: Search methodology, databases searched, search period, descriptors, criteria for inclusion and exclusion of articles, search strategy, and synthesis of evidence. As the search progresses it is refined and filtering all relevant information of the selected topic; thus we were only the information you really need for our research. In this regard, a final chart summarizing all the information obtained, and thus obtain the synthesis of the scientific evidence is organized.

**Table 1**

Topic	Descriptors	Single Search	Advanced Search	Selected Articles
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## SUMMARY

An organized search for understanding the structure of an area of knowledge and relationships that exist within this structure, initially formed by a network covering different topics. This network built starts with the research problem, there are taking part as regards the issue's importance, significance, originality, and feasibility boundary. The solution to the problem should contribute to greater knowledge. Must be something new at the same time arouse enthusiasm and deep interest in the research; the problem must be feasible to investigate in practice and on schedule, conform to their resources and research the area where you have more experience.

## CONCLUSIONS

Information search can: Reduce the need for information. Define the scope. Define the search terms. Identify possible sources. Select search tools. Run the search and to evaluate the information found. The literature search is essential to evaluate the importance of the research question and choosing the type of study design element. It also helps us to learn from mistakes or limitations of previous studies, in general, are statements by their authors in the discussion section, or in the correspondence that is generated after the publication of an article.

The construction of the taxonomic tree built allows the specificity of knowledge, what is known and not known phenomenon to investigate, also allows us to make a critical inventory of the articles reviewed, making a theoretical ordering of parts and build our own criteria .

The importance of databases is that today occupy a particular place in any area of human endeavor, both professional, commercial and technological level. Not only the people involved in the area of computer science, but people all administrative, technical and even more so the health professionals of any discipline, they must have the necessary knowledge to use and have access to specialized thesauri and databases.

The construction of our subject area leads to a sweep of all existing and systematically ordered information.

The use of thesauri allow a combinatorial structure used to represent the content of the documents, in order to later retrieval through a preferred indexing terms, also called descriptors, systematically used to uniquely represent certain concepts.

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